REMARKS

Applicant has now reviewed the Office Action made final, dated February 11, 2002, and the Advisory Action, mailed April 17, 2002, in connection with the present application. Those documents have rejected all pending claims 1-23. The primary reference, Weber, et al. ('504), being variously combined with the references Stanley, et al. ('497), Niikura, et al. ('744) and Moriyama ('638), to reject each of the pending claims.

Applicant has now added and amended claims to address the outstanding issues. Consideration of these changes is respectfully requested.

Applicant has canceled original independent claim 1, and its correspondent dependent claims 3, 4, 6, 7, 8, 11, 12 and 13. Further, claims 22 and 23, which depend from now-amended claim 17, have also been canceled.

With attention to newly-added independent claim 24, set forth is a printhead signature correction method for a high resolution printer system. Among the steps incorporated in such a system is the generation, at the time of the manufacture of the printhead, a data file of ink droplet compensation values used to control the operation of the printhead. These values are supplied with a printing system leaving the manufacturing plant to address imperfections in a printhead design or other defects. The correction method further includes discharging ink droplets to a predetermined pattern to form a test image, and from this test image determining differences between various parameters between a first ink droplet and a second ink droplet. These parameters may include distance from a target point, parallelism between the ink drops, and a dimensional analysis of the ink drops. Based on this analysis, updated compensation values are obtained. Using these values, a user adjusts the compensation values previously supplied at the manufacturing site. Through the adjustment of the compensation values, an updated data file is generated which will regulate the printing operation of the printhead.

It is respectfully submitted none of the cited art fairly considers the concepts discussed above, which permit a user with the ability to adjust the compensation values previously entered at the manufacturing site based on the parameters generated by the users in relation to the ink droplets of a test image. Such capability provides for an improved effective manner of addressing undesirable printing output deficiencies.

Further, as previously argued, the present system does not need sophisticated

detection analysis devices which themselves must be closely calibrated. Particularly, as previously noted, Weber, et al. requires an optical sensing device to determine placement of the ink dots. However, as previously noted in the application, the present system permits for these adjustments to occur without the requirement of such devices. While the system is flexible enough to use information obtained through the use of items such as an optical measuring device, it is not required.

Applicant has added new claim 31 to reflect the concept that the present method step of determining differences between at least one of a parameter of a first ink droplet and a parameter of a second ink droplet includes making such determination through the use of human vision.

The adjustment concepts claimed in claim 24, and noted claim 31, are not taught or fairly suggested by Weber, et al. or any of the other cited art.

Turning to dependent claim 25, a further advantage described in the present application is placing the ink ejectors of a printhead into sets of grouped ink ejectors. These groupings may be determined either by the location on the printhead itself or groupings based on existing ink droplet compensation values. None of the cited art address this particular feature. In fact, Weber, et al. discusses the ability to provide individual control for each of the nozzles of a printhead (col. 6, lines 15-25).

Distinct advantages exist by this grouping concept. In particular, by not requiring a user to individually select each nozzle compensation value, compensation operation is expedited, thereby encouraging the compensation operation to take place as opposed to the user knowing they need to individually compensate each ejector, which becomes a tedious task. These groupings are presented as groups to a user (claim 26) to speed up the compensation operation. As noted in claim 27, the adjusted compensation value will be the same for all ejectors in a specific group. Again, this will accelerate the compensation operation. Also, it has been found that due to the similarity of groupings, compensation values will be substantially equivalent, and therefore a deterioration of the quality of output is not notable.

As by implementing these concepts, it is possible to reduce the drop displacement errors to plus or minus 4 microns (claim 28) in a high addressability direction. This capability is not shown or suggested in the cited art. Further, as stated in claims 30 and 32,

the methods described are for a printhead which is a high addressability, high resolution printhead where the nozzle or ejector will have a density of 600 nozzles or ejectors per inch, and the printhead resolution will be equal to or greater than 12000 pixels per inch. Again, the printhead designs of the cited art do not address the method steps for a system as described in these claims.

Claim 14 has been amended to emphasize the described system permits for the updating of the compensation values based on the determined differences between the first set of ink droplets and the second ink droplets by a user. Again, as noted, this updating of the compensation values by a user is not taught or fairly suggesting in the cited art.

Turning to independent claim 17, this system claim is now further defined to show that the printhead facility includes a data file that has a plurality of compensation values used to control operation of the printhead. Further provided with the printhead facility is a compensation adjustment mechanism which is configured to allow a user to update the compensation values stored in the data file. As previously noted, it is submitted the cited references do not permit a user as defined herein to update the compensation values.

In addition to the amendment to independent claim 17, new dependent claims 32-34 have been added to additionally define distinctive aspects of the present application. For example, in claim 32, it is now recited that the printhead facility includes a grouping mechanism to group the ink injectors of the printhead into sets of grouped ink ejectors. These groupings may be determined by the location of the printhead, or groupings may be based on existing ink drop compensation values. Claim 33 illustrates the concept that the compensation adjustment mechanism will permit a user at an operation site to make the compensation value adjustments. Lastly, dependent claim 34 notes that the compensation adjustment mechanism adjusts all ink ejectors in a group with the same compensation value. These concepts are not taught or fairly suggested by the cited art.

CONCLUSION

For the reasons detailed above, it is respectfully submitted all claims remaining in the application are now in condition for allowance. An early notice to that effect is therefore earnestly solicited.

Respectfully submitted,

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Attachment: Version With Markings to Show Changes Made

CERTIFICATE OF MAILING

I hereby certify that this Preliminary Amendment is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Assistant Commissioner of Patents and Trademarks, Washington, D.C. 20231, Box RCE, on **June 11, 2002**.

By _____
Karen M. Forsyth

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Claims

Please cancel claims 1, 3, 4, 6, 7, 8, 11, 12, 13, 22 and 23.

Please amend claims 2, 5, 9, 10, 14 and 17 as follows:

2. (Amended) The method of claim [1] 24, wherein the step of [measuring] determining further comprises the step of measuring the velocity of the first ink droplet discharged from the printhead relative to the velocity of the second ink droplet discharged from the printhead.

5. (Amended) The method of claim [4] 24, further comprising the steps of:

generating an ink droplet velocity profile for the printhead from the [measured difference] determined differences between the parameters of the first and second ink droplets[; and

compensating for any variation in the ink droplet velocity profile by varying the discharge of the ink droplets from the printhead].

9. (Amended) The method of claim [4] 24, wherein the step of [controlling the discharging of the ink droplets further] regulating the printing operation comprises the step of determining an air gap distance between [the] an imaging medium and the printhead, and based on the air gap distance, [controlling the discharge of the droplets from the printhead] adjusting the compensation values to regulate the printing operation.

10. (Twice Amended) The method of claim [1] 24, further comprising the step of:

adjusting at least one of

(a) a tilt position of the printhead;

(b) a direction of one of said first and second ink droplets; and

(c) a speed of one of said first and second ink droplets; based on said [measured parameter difference] adjusted compensation values.

14. (Twice Amended) In an image forming system, a method of forming an image with a printhead, the method comprising the steps of:

discharging a first set of ink droplets and a second set of ink droplets from the printhead onto a print medium to form an image;

determining differences in distance between the first set of ink droplets and the second set of ink droplets once deposited on the print medium; [and]

updating, by a user, compensation values based on the determined differences between the first set of ink droplets and the second set of ink droplets; and

controlling a subsequent discharge of the ink droplets from the printhead based on the [differences in distance] updated compensation values.

17. (Twice Amended) An image forming system; comprising:

a printhead;

a processor for controlling the printhead; and

a printhead facility coupled to the processor for controlling the printhead based on differences between a parameter of a first ink droplet and a parameter of second ink droplet measured after formation of an image on an imaging medium, the printhead facility including,

a data file including a plurality of compensation values used to control operation of the printhead, and

a compensation adjustment mechanism configured to permit a user to update the compensation values stored in the data file.

Please add new claims 24-34 as follows:

24. (New) A printhead signature correction method for a high resolution printer system, the method comprising:

(a) generating, at the time of manufacture of the printhead, a data file of ink droplet compensation values used to control operation of the printhead;

(b) discharging ink droplets in a predetermined pattern from the high resolution printer system to form a test image on an image medium;

(c) determining differences between at least one parameter of a first ink droplet and at least one parameter of a second ink droplet of the image, the at least one parameter of the first and second ink droplets being at least one of droplet distance from a target point, parallelism between the first ink droplet and the second ink droplet, or a dimensional analysis of the first and second ink droplets on the image medium;

(d) deriving updated ink droplet compensation values for the ink droplets, based on at least one of the parameters;

(e) adjusting, by a user, the ink droplet compensation values stored in the data file;

(f) generating an updated data file including the adjusted ink droplet compensation values; and

(g) regulating the printing operation by use of the compensation values stored in the updated data file.

25. (New) The method according to claim 24 further including,

grouping the ink ejectors of the printhead into sets of grouped ink ejectors, the groupings determined by location in the printhead or groupings based on existing ink droplet compensation values.

26. (New) The method according to claim 25 further including,

presenting the user with the ink ejectors as a plurality of individual groupings.

27. (New) The method according to claim 26, wherein the adjusting step includes

adjusting all the ink ejectors in a specific grouping by a same value.

28. (New) The method according to claim 25, wherein the step of adjusting the compensation values in the data file reduces drop placement errors to plus or minus four microns in a high addressability direction.

29. (New) The method according to claim 24, wherein the compensation values are used for a printhead having a nozzle or ejector density of 600 nozzles or ejectors per inch.

30. (New) The method according to claim 24 wherein printhead resolution is equal to or greater than 1200 pixels per inch.

31. (New) The method according to claim 25, wherein the determining step is accomplished through the use of human vision.

32. (New) The system of claim 17 further including,

a group mechanism which forms groups of ink ejectors of the printhead into sets of grouped ink ejectors, the groupings determined by location in the printhead or determined based on existing ink droplet compensation values.

33. (New) The system of claim 17, wherein the compensation adjustment mechanism is further configured to permit a user at an operation site to make the compensation value adjustments.

34. (New) The system of claim 32, wherein compensation adjustment mechanism adjusts all ink ejectors in a group to a same compensation value.